404 Mitigation Considerations – Mitigation Ratio Setting Checklist

Wetlands Roundtable

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ALBUQUERQUE DISTRICT
US Army Corps of Engineers

One Team **Destined For Greatness**

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STANDARD OPERATING PROCEDURE FOR DETERMINATION OF MITIGATION RATIOS

US Army Corps of Engineers

12501-SPD
REGULATORY PROGRAM
STANDARD OPERATING PROCEDURE
FOR DETERMINATION OF
MITIGATION RATIOS

South Pacific Division

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1.0 Purpose. The purpose of this document is to outline the process for determining compensatory mitigation requirements as required for processing of Department of the Army (DA) permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. .

2.0 Applicability. This process applies to the Regulatory Program within South Pacific Division (SPD), including its four subordinate districts, Albuquerque District (SPA), Sacramento District (SPK), Los Angeles District (SPL),and San Francisco District (SPN). Subordinate offices or organizations shall not modify this procedure to form a specific procedure. This procedure is applicable for all permit applications received after 20 April 2011.

3.0 References.

Compensatory Mitigation for Losses of Aquatic Resources (33 C.F.R. Part 332).

Smith, R. D., D. R., A. Ammann, C. Bartoldus, M. M. Brinson. 1995. An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices., Wetlands Research Program Technical Report WRP-DE-9. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/1998/classwet/classwet.htm (Version 04DEC98).

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2008. California Rapid Assessment Method (CRAM) for Wetlands. Version 5.0.2. 151 pp.

4.0 Related Procedures.

None.

5.0 Definitions.

Compensatory mitigation - The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Condition - The relative ability of an aquatic resource to support and maintain a community of organisms having a species composition, diversity, and functional organization comparable to reference aquatic resources in the region.

Enhancement - The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Establishment (creation) - The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

Functions - The physical, chemical, and biological processes that occur in ecosystems.

Impact - Adverse effect.

In-kind - A resource of a similar structural and functional type to the impacted resource.

In-lieu fee program - A program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for DA permits.

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Mitigation Ratio-Setting Procedure

- Finalized April 20, 2011, by regional team from Albuquerque, Los Angeles, San Francisco and Sacramento (2 year effort)
- 1st update January 2012, 2nd update August 2012
- Current update should be in effect soon.

- Benefits:
  - Provides structured decision-making procedure while retaining flexibility
  - Allows for qualitative or quantitative assessments of impacts & mitigation
  - Results in a written rationale (decision document) for each ratio determination
  - Includes guidance for each step of checklist

- Incorporates use of functional/condition assessments when available/required

Mitigation Ratio-Setting Procedure

- **STANDARD OPERATING PROCEDURE FOR DETERMINATION OF MITIGATION RATIOS – List of Documents**
  - **1 Flowchart**
  - **4 Attachments**
    - **1. Mitigation Ratio Setting Checklist**
    - **2. Instructions**
    - **3. Examples**
    - **4. Checklist Step 3, BAMI spreadsheet**
    - **5. This training presentation**
    - **6. Checklist in Excel format**

Attachment 1 (page 1) SPD Mitigation Ratio Setting Checklist

Attachment 12501.1 - SPD Mitigation Ratio Setting Checklist

1	Date: _____ Corps file no.: _____ Project Manager: _____ Impact site name: _____ ORM impact resource type: _____ Impact Cowardin or HGM type: _____ Impact area (acres): _____ Impact distance (linear feet): _____	Column A: Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____	Column B (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____	Column C (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____
2	**QUALITATIVE impact-mitigation comparison**: Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☐ No ☐	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example in attachment 12501.2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/ condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__
4	**Mitigation site location**:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

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Attachment 1 (page 2)
SPD Mitigation Ratio Setting Checklist

5	**Net loss of aquatic resource surface area**:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:**	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
7	**Risk and uncertainty**:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
8	**Temporal loss**:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):**	Column A: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Proposed impact (total): ___ acre ___ linear feet to Resource type: _____ Cowardin or HGM: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:**	PM summary:		

Attachment 2 Instructions (step 1)

All steps in checklist are additive

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

1

Date: _____ Corps file no.: _____ Project Manager: _____

Impact site name: _____ ORM impact resource type: _____
Cowardin or HGM type: _____ Impact area (acres): _____ Impact distance (linear feet): _____

For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).

Column A:	Column B (optional):	Column C (optional):
Mitigation site name: _____	Mitigation site name: _____	Mitigation site name: _____
Mitigation type: _____	Mitigation type: _____	Mitigation type: _____
Resource type: _____	Resource type: _____	Resource type: _____
Cowardin/HGM type: _____	Cowardin/HGM type: _____	Cowardin/HGM type: _____

Generally, one impact site per checklist.

Use either Cowardin *or* HGM classification system for impact and mitigation sites within a checklist, not both.

Write in mitigation type, but not the amount. Could be applicant's proposal or project manager's proposal.

Complete column A first for steps 1-9, then B 1-9 (if needed), then C (if needed). Then combine results in step 10.

Alternative ways of using checklist columns:
A only (1 mitigation site/type)
A and B (2 mitigation sites/types)
A, B, and C (3 mitigation sites/types)
A vs. B (compare two proposals)

Attachment 2 Instructions (step 2)

2	**QUALITATIVE impact-mitigation comparison:** Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☐ No ☐ Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Note: adjustments for preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. For most functions, if I < M, then use adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add ABS of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. Suite of potential functions from HGM (alternate lists of functions may be used): a. Short- or long-term surface water storage b. Subsurface water storage c. Moderation of groundwater flow or discharge d. Dissipation of energy e. Cycling of nutrients f. Removal of elements and compounds g. Retention of particulates h. Export of organic carbon i. Maintenance of plant and animal communities	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:

"Starting ratio" now 1:1

Step 2 adjustment added to 1:1 starting ratio to obtain "baseline ratio"

PM justification MUST be filled out for each adjustment (each step that is completed).

Not a numeric comparison. No calculations necessary.

Attachment 2 nstructions (steps 3-4

Suggestion: when determined to be appropriate, project managers should request functional/condition assessment analysis early in the application process!

Add baseline ratio from BAMI spreadsheet

Note correction (2,5 vs. 3). See FAQ.

Upcoming regional mitigation and monitoring guidelines will recommend functional/condition assessment methods.

Extreme cases addressed here.

3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2. Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/ condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants higher mitigation ratio. The PM will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

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Attachment 2: Instructions (step 3 e)

Another appropriate method can be substituted. PM's can adapt BAMI spreadsheet to their functional/condition assessment method and enter data provided by applicant.

Attachment 12501.4-SPD - Before-After-Mitigation-Impact (BAMI) procedure (CRAM example)

Functions/conditions	$Impact_{Before}$	$Impact_{After}$	$Impact_{delta}$	$Mitigation_{Before}$	$Mitigation_{After}$	$Mitigation_{delta}$
4.1 Buffer and Landscape Context						
4.1.1 Landscape Connectivity	9	3	-6	6	6	0
4.1.2 Percent of AA with Buffer	12	6	-6	3	9	6
4.1.3 Average Buffer Width	3	3	0	3	12	9
4.1.4 Buffer Condition	6	6	0	3	9	6
RAW SCORE	**15.0**	**8.0**	**-7**	**9.0**	**15.7**	**7**
FINAL SCORE	**62.5**	**33.6**	**-29**	**37.5**	**65.3**	**28**
4.2 Attribute 2: Hydrology						
4.2.1 Water Source	6	6	0	6	6	0
4.2.2 Hydroperiod or Channel Stability	9	12	3	3	9	6
4.2.3 Hydrologic Connectivity	12	9	-3	3	12	9
RAW SCORE	**27.0**	**27.0**	**0**	**12.0**	**27.0**	**15**
FINAL SCORE	**75.0**	**75.0**	**0**	**33.4**	**75.0**	**42**
4.3 Attribute 3: Physical Structure						
4.3.1 Structural Patch Richness	6	3	-3	3	9	6
4.3.2 Topographic Complexity	6	3	-3	3	6	3
RAW SCORE	**12.0**	**6.0**	**-6**	**6.0**	**15.0**	**9**
FINAL SCORE	**50.0**	**25.0**	**-25**	**25.0**	**62.5**	**38**
4.4 Attribute 4: Biotic Structure						
4.4.1 Number of Plant Layers	12	9	-3	6	9	3
4.4.2 Co-Dominant Species	6	6	0	6	12	6
4.4.3 Percent Invasion	6	9	3	3	12	9
4.4.4 Interspersion/Zonation	9	3	-6	3	9	6
4.4.5 Vertical Structure	6	3	-3	3	6	3
RAW SCORE	**23**	**14**	**-9**	**11**	**26**	**15**
FINAL SCORE	**63.9**	**38.9**	**-25**	**30.6**	**72.3**	**42**
OVERALL SCORE	**65.0**	**46.0**	**-19**	**32.0**	**70.0**	**38**

$Quotient=ABS(M/I)_{deltas}$
2
Baseline ratio:
1 : 2

Since functional loss < functional gain, step 3 adjusts mitigation ratio downward (less mitigation required). 1:2 ratio is the same as a 0.5:1 ratio.

Need instructions? See next slide.

Step 3 Instructions

Instructions:

1. Choose functional method. Acceptable functional assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, and must be approved by the applicable Corps District.
2. List functions/condition categories in leftmost column
3. Utilize Before-After-Mitigation-Impact (BAMI) procedure above to calculate function deltas
4. Obtain absolute value (ABS*) of quotient of mitigation-delta over impact-delta for overall score (if method has no overall score, use median of quotients for function categories or individual functions. *Absolute value is the nonnegative number for any real number, so if your quotient is negative, simply drop the negative sign to get the ABS. For example: the ABS of -9/3 = 3.
5. To get baseline ratio: If quotient (Q) is less than 1, baseline ratio = 1/Q : 1; if quotient is greater than 1, baseline ratio = 1 : Q.
6. Input Step 3 baseline ratio into the checklist document

Example 1 (gain twice the loss):
$Q = ABS(M/I)_{deltas} = ABS(38 \div -19) = 2$,
Since Q is greater than 1,
Add Q to right (impact) side of ratio,
and baseline ratio = 1:Q = 1:2 = 0.5:1

Example 2 (gain a third of loss):
$Q = ABS(M/I)_{deltas} = ABS(15 \div -45) = 0.33$,
Since Q is less than 1,
Add 1/Q to left (mitigation) side of ratio,
and baseline ratio = 1/Q:1 = 1/0.33:1 = 3:1

Attachment 2 Instructions (steps 5-6)

5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 C.F.R. 332.2. Re-establishment or establishment +0, Rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/ condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). PM will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

Definition of "highly valuable" will vary across ecoregions, watersheds, etc.

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Attachment 2 Instructions (step 7)

7	**Risk and uncertainty** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) Permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 C.F.R. 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no factors). Generally, uncertainty in banks and in lieu fee programs is accounted for in the credit release process.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

- Note: if too many uncertainty factors are identified, this may indicate the overall mitigation proposal/design is not acceptable

Attachment 2 Instructions (step 8)

8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. PM should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for Permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

PDT chose simple approach, rather then using complex and unvalidated temporal loss equations proposed in the literature.

Steps 9 and 10 should be project manager's independent assessment of mitigation requirements. The checklist is NOT intended to match an applicant's proposal.

Attachment 2 nstructions (steps 9-10

Remaining impact (unmitigate d impact (if any) after mitigation in column A considered.

Refers to steps 2 & 3.

Remaining impact (unmitigat ed impact) (if any) after mitigation in column B considered

Adjustments additive

Text narrative of final, combined (all columns) mitigation requirement.

Use if appropriat e.

9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). PM should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-tidal wetland, other, pond, stream/river/ocean, tidal wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; e. Note: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative)).	Column A: 1. Baseline ratio from step 2 or 3 = __ : __ 2. Total adjustments = ___ 3. Final ratio: __ : __ Proposed impact (total): ___ acre ___ linear feet to Resource type: _____ Cowardin or HGM: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:	Column B: 1. Baseline ratio from step 2 or 3 = __ : __ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:	Column C: 1. Baseline ratio from step 2 or 3 = __ : __ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:**. PM should summarize the checklist results, combining all required mitigation for this impact site.	PM summary:		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulati impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessme must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

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Attachment 3
Examples of Mitigation Ratio Setting Checklist

Attachment 12501.3-SPD - Examples for SPD Mitigation Ratio Setting Checklist

We'll go through example #1.

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Attachment 3
Example 1 (overview)

Checklist Example 1: one impact site/type with two mitigation sites/types

Impact(s): The applicant is proposing to permanently impact 0.3 acre (870 linear feet) of intermittent stream with mature, native riparian vegetation (southern willow woodland).

Proposed mitigation: The applicant has proposed to mitigate through: 1) 0.3 acre of on-site, in-kind establishment of intermittent stream by re-aligning the existing stream such that the new alignment would be constructed across existing uplands (prior to grading to reduce elevations appropriately); and 2) 0.6 acre of off-site, out-of-kind enhancement of depressional wetland through a mitigation bank.

Method: The project manager has completed one checklist (see below), using column "A" for the on-site, proposed mitigation and column "B" for the off-site proposed mitigation.

Results: After completing the checklist columns "A" and "B", and after discussing the results with the applicant, the project manager has determined the final mitigation ratios to be 1:1 for on-site (0.3 acre, as proposed) and 4:1 for off-site (0.84 acre of enhancement credit). As part of this process, the applicant agreed to increase his/her off-site mitigation from 0.6 acre to 0.84 acre. The project manager then entered the final requirement on the last page of the checklist and added the completed checklist to the administrative record (either as a paper copy in the paper file or as an electronic file in ORM). Alternatively, the project manager and/or applicant could have proposed all on-site mitigation (0.99 acre of establishment) or all off-site mitigation (1.2 acre of enhancement) to mitigate for the proposed impact. Regardless of the outcome of any negotiations, the final mitigation ratio(s) and requirement(s) should be explicitly described in steps 9 and 10 of the checklist.

Attachment 3: Example 1 (steps 1-2)

SPD mitigation ratio setting checklist

1	Date: 5/17/2010 Corps file no.: 2010-XYZ Project Manager: John Doe Impact site name: Tullay Creek ORM impact resource type: stream Impact Cowardin or HGM type: riverine-intermittent Impact area (acres): 0.3 Impact distance (linear feet): 870	Column A: Mitigation site name: Tullay Creek Mitigation type: establishment Resource type: stream Cowardin/HGM type: riverine-intermittent	Column B (optional): Mitigation site name: WL bank Mitigation type: enhancement Resource type: non-tidal WL Cowardin/HGM type: palustrine	Column C (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____
2	**QUALITATIVE impact-mitigation comparison**: Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☐ No ☒	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: 0 Baseline ratio: 1:1 PM justification: impact and mitigation are within the same water body, habitat type, etc., so functional gain and loss would be equal.	Starting ratio: 1:1 Ratio adjustment: +3 Baseline ratio: 4:1 PM justification: Functional loss is greater than functional gain since in this case, there is total functional loss and only gain of selected functions via enhancement.	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:

Attachment 3: Example 1 (steps 3-7)

3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example in attachment 12501.2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/ condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__
4	**Mitigation site location**:	Ratio adjustment: 0 PM justification: impact and mitigation would be within the same watershed	Ratio adjustment: 0 PM justification: impact and mitigation would be within the same watershed	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**:	Ratio adjustment: 0 PM justification: establishment	Ratio adjustment: +1 PM justification: enhancement	Ratio adjustment: PM justification:
6	**Type conversion:**	Ratio adjustment: 0 PM justification: n,n: no difference between impact and mitigation types	Ratio adjustment: 0 PM justification: intermittent riparian (willow woodland) and depressional wetlands not substantially different in terms of relative value.	Ratio adjustment: PM justification:
7	**Risk and uncertainty**:	Ratio adjustment: +0.3 PM justification: +0.1 for permittee-responsible mitigation, +0.2 as mitigation site did not formerly support target aquatic resource.	Ratio adjustment: 0 PM justification: mitigation bank, uncertainty factors not applicable.	Ratio adjustment: PM justification:

Attachment 3: Example 1 (steps 8-10)

8	**Temporal loss:**	Ratio adjustment: +3 PM justification: a: No planned delay, impact and mitigation to be constructed simultaneously. b: Both to include mature willow canopy (trees/woodlands), +3 to account for time to achieve full functions.	Ratio adjustment: 0 PM justification: bank, no delay	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):**	Column A: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3.Final ratio: _3.3_ : _1_ Proposed impact (total): __0.3_ acre _870__ linear feet to Resource type: ____stream_____ Cowardin or HGM: riverine-intermittent Required mitigation: _0.3*__ acre _900__ linear feet of Mitigation type: __establishment_____ Resource type: _____same_____ Cowardin or HGM: ____same_____ Additional PM comments: *Applicant proposed alternate, off-site mitigation to account for difference between proposed (0.3 acre establishment, 1:1) and Corps assessment using checklist (0.99 acre establishment, 3.3:1). 0.69 acre of Corps assessment not met = 0.69/0.99*100 = 70%. 70% of impact unmitigated = 0.21 acre of impact. See column B.	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: _4.0_ : _1_ Remaining impact: ___0.21 acre_ Required mitigation: _0.84_ acre ___ linear feet of Mitigation type: _enhancement_ Resource type: __non-tidal WL_ Cowardin or HGM: palustrine, depressional wetland Additional PM comments: Applicant originally proposed 0.6 acre of off-site enhancement via bank. Through checklist, I've determined requirement should be 0.84 acre. Applicant has agreed to provide 0.84 acre of wetland enhancement credit at XYZ bank.	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:**	PM summary: The final compensatory mitigation requirement for this impact site is 0.3 acre (900 linear feet) of on-site riverine-intermittent stream (realignment of Tullay Creek, mature willow woodland) and 0.84 acre of off-site enhancement of depressional wetland through the XYZ mitigation bank.		

Attachment 6: Checklist in Excel Format

1		Date: 8/2/2012	Corps File No.:		SPL-201200000-XXX		Project Manager:		Jane Regulatory					
2		Impact Site Name:	PROJECT						ORM Impact Resource Type:			Riverine		
3		Impact Cowardin or HGM type:	Riverine		Impact area:		1.5		acres		Impact distance:	5,000		linear feet
4			**Column A**				**Column B**					**Column C**		
5			Mitigation Site Name:		Realigned Ditch		Mitigation Site Name:		Preservation			Mitigation Site Name:		
6			Mitigation Type:		re-establishment		Mitigation Type:		preservation			Mitigation Type:		
7			Resource Type:		perennial		Resource Type:		perennial			Resource Type:		
8			Cowardin/HGM type:		Riverine		Cowardin/HGM type:		Riverine			Cowardin/HGM type:		
9	2	**Qualitative impact-mitigation comparison:**	Ratio adjustment:			:	Ratio adjustment:		**5.0**	:	**1.0**	Ratio adjustment:		:
10			PM justification:				PM justification: Preservation does not result in functional gain.					PM justification:		
11														
12	3	**Quantitative impact-mitigation comparison:**	Ratio adjustment from BAMI procedure (attached):		**1.0**	: **2.0**	Ratio adjustment from BAMI procedure (attached):			:		Ratio adjustment from BAMI procedure (attached):		:
13	4	**Mitigation site location:**	Ratio adjustment:		**1**		Ratio adjustment:		**0**			Ratio adjustment:		
14			PM justification: outside watershed				PM justification: within watershed					PM justification: within watershed		
15														
16	5	**Net loss of aquatic resource surface area:**	Ratio adjustment:		**0**		Ratio adjustment:		**1**			Ratio adjustment:		
17			PM justification: re-establishment				PM justification: preservation					PM justification:		
18														
19	6	**Type conversion:**	Ratio adjustment:		**0**		Ratio adjustment:		**0**			Ratio adjustment:		
20			PM justification: in-kind				PM justification: in-kind					PM justification:		
21														
22	7	**Risk and uncertainty:**	Ratio adjustment:		**0.5**		Ratio adjustment:		**0.4**			Ratio adjustment:		
23			PM justification: +0.1 permittee responsible; +0.2 mitigation site did not support aquatic resource, +0.2 no detailed designs provided				PM justification: +0.4 locations not identified					PM justification: +0.4 locations not identified		
24														
25	8	**Temporal loss:**	Ratio adjustment:		**0.3**		Ratio adjustment:		**0.3**			Ratio adjustment:		
26			PM justification: Temporary impacts during construction would be approximately 3 to 6 months to establish new operational drainages.				PM justification: Preservation site has not been secured.					PM justification:		
27														
28	9	**Final mitigation ratio(s):**	Baseline ratio from 2 or 3:		1	: 2	Baseline ratio from 2 or 3:		5	: 1		Baseline ratio from 2 or 3:		:
29			Total adjustments (4-8):		1.8		Total adjustments (4-8):		1.7			Total adjustments (4-8):		0
30			**Final ratio:**		**2.8**	: **2**	Final ratio:		**6.7**	: **1**		Final ratio:		**0** :
31			Proposed impact (total):		1.5	acres	Remaining impact:		0.79	acres		Remaining impact (acres):		acres
32					5000	linear feet			2613	linear feet		Remaining impact (linear feet):		#VALUE! linear feet
33			to Resource type:		Riverine		to Resource type:		Riverine			to Resource type:		Riverine
34			Cowardin or HGM:		Riverine		Cowardin or HGM:		Riverine			Cowardin or HGM:		Riverine
35														
36			Required Mitigation*:		4.2	acres	Required Mitigation*:		5.3	acres		Required Mitigation:		#VALUE! acres
37					14000	linear feet			17548	linear feet				#VALUE! linear feet
38			of Resource type:		perennial		of Resource type:		perennial			of Resource type:		0
39			Cowardin or HGM:		Riverine		Cowardin or HGM:		Riverine			Cowardin or HGM:		0
40			Proposed Mitigation**:		1.00	acres	Proposed Mitigation**:			acres		Proposed Mitigation**:		acres
41					3644	linear feet				linear feet				linear feet
42			Impact Unmitigated:		52	%	Impact Unmitigated:			%		Impact Unmitigated:		
43					0.79	acres				acres				
44			Additional PM comments:				Additional PM comments:					Additional PM comments:		
45														
46														
47	10	**Final compensatory**	Final requirement is for 1.00 acre (3644 lin ft) of perennial re-establishment and 5.3 acres of perennial preservation.											
48														
49														
50			*At PM's discretion, if applicant's proposed mitigation is less than checklist requirement and additional mitigation type(s) proposed, complete additional columns as needed.											
51			**Only enter proposed mitigation into spreadsheet if accepting applicant's lower (than required ratio) proposal.											

Frequently Asked Questions (FAQ)

- **Q1: Do I have to complete this checklist for all my Regulatory projects?**
  - **A: Not for all projects. Completing the checklist is an SPD requirement for any project requiring compensatory mitigation.**
- **Q2: What do you mean by "remaining impact" or "unmitigated impact"?**
  - **A: This is the difference between an applicant's initial, proposed mitigation and the mitigation requirement determined by the PM (using the checklist). If the latter is greater, the applicant may agree to the higher mitigation amount, or PM may use additional columns to evaluate additional mitigation sites/types.**
- **Q3: Can I use any functional/condition assessment for step 3?**
  - **A: Yes, if it is approved by your district and complies with district (or upcoming regional) mitigation and monitoring guidelines. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. Any such method should fit into the before-after-mitigation-impact (BAMI) structure and adjustment formula.**

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FAQs (continued)

- **Q4: should checklist be attached to decision documents?**
  - **A: Yes.**
- **Q5: Why are steps 3 and 5 mutually exclusive?**
  - **A: On the question of whether the checklist should treat consideration of a "functional/condition assessment" (step 3 for quantitative comparison of functions/condition metrics) and "net loss of aquatic resource area" (step 5) as mutually exclusive, if a functional/condition assessment method is used that explicitly accounts for area (such as HGM), they should be mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used.**

- **Q6: Why are adjustments added? Why not multiplied or averaged?**
  - **A: These would all be equally valid methods for combining the steps of the checklist; however the PDT chose to add the adjustments and the individual adjustments are calibrated with addition in mind. Multiplying or averaging would require numerically different adjustments, although the final outcome would be the same.**
- **Q7: For step 2: why is a range of -2 to 4 suggested?**
  - **A: To account for preservation-only mitigation proposals (where functional gain would be zero), a higher penalty (mitigation ratio adjusted upwards) was deemed appropriate by the PDT (hence the upward limit of 4). The opposite case (zero functional loss) doesn't occur for projects where compensatory mitigation is required to offset permitted impacts. For this reason, the potential downward adjustment was limited to -2.**
- **Q8: How do I qualitatively compare functions?**
  - **A: Using a list of functions (HGM functions are provided on checklist as an example, but other lists can be used instead), the project manager should compare the proposed impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites (see example 7 in attachment 12501.3). For most functions, if I < M, then use adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. This comparison should not be a numerical calculation of change for individual functions, but rather a qualitative and relative estimate of change for each function.**

FAQs (continued)

- **Q9: How did the PDT come up with these specific adjustments? Aren't these numbers subjective? How do you address that?**
  - **A: Yes, they are subjective to some extent (this is unavoidable); however, these instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. In coming up with these numbers, we did NOT want to come up with a rigid series of equations or overly-specific requirements. Rather, we sought to provide examples and instructions with clearly-explained rationales for making various adjustments. The PM is free to deviate from these, as long as justification is provided in the checklist. The checklist requires a PM to explain in writing his/her determination for a particular mitigation ratio rather than simply cite "best professional judgment" as in the past. Will applicant's argue over a PM's choice of specific adjustments? Yes, but this is no different than past negotiations on mitigation requirements, and our determinations should be based on scientific information, facts, field data, etc. Also, level of analysis should be commensurate with level of impact, and arguing over small numerical differences (+0.01 vs. 0.02) would be a waste of project manager time and resources. In the end, the Corps makes its determination of mitigation requirements, and permittees can appeal if they desire.**
- **Q10: Step 2 and 5 seem to double count (double penalize) Preservation-only.**
  - **A: Project managers should use their judgment. If the preservation-only mitigation proposal has been adequately accounted for in one step, the project manager can note that in the other step; however, both functional gain (or lack of) and net loss of area should be considered.**

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FAQs (continued)

- **Q11: How do you know functional gain if a bank is being used?**
  - **A: From the mitigation rule, page 19685 under 332.8 for banks and ILF's: "(2) Assessment. Where practicable, an appropriate assessment method (e.g., hydrogeomorphic approach to wetlands functional assessment, index of biological integrity) or other suitable metric *must* be used to assess and describe the aquatic resource types that will be restored, established, enhanced and/or preserved by the mitigation bank or in-lieu fee project. (3) Credit production. The number of credits *must* reflect the difference between pre- and post-compensatory mitigation project site conditions, as determined by a functional or condition assessment or other suitable metric." In summary, a bank or ILF instrument should have included some estimate of expected functional gain. If the bank never did a before assessment, a project manager can work with the bank/ILF POC (or have the sponsor prepare) an estimate of before conditions using the chosen assessment method. For most ratio determinations using the BAMI comparison, the "after" condition would be estimated prior to the mitigation ratio determination; however in this case, the "before" condition at the bank site would also be estimated. For most banks/ILF's, there should be sufficient information of pre-existing conditions to make a "before" analysis possible. The only difference being that, for constructed banks/ILF's, it would not be possible to verify the "before" estimate with real data as could be done for "after" estimates through post-impact and post-mitigation (monitoring) assessments.**
- **Q12: Step 7: if a financial assurance is required and step 7 adjusts the ratio upwards for uncertainty, isn't this double-penalizing?**
  - **A: No, because despite having a financial assurance, the on-the-ground uncertainty does not disappear, and in order to ensure that mitigation successfully offsets impacts, additional mitigation may be required on the assumption that some portion of the site may fail, or that the overall site may never reach the expected/predicted level if functioning (in which case, the Corps may need to fund mitigation elsewhere if the permittee fails to do so).**

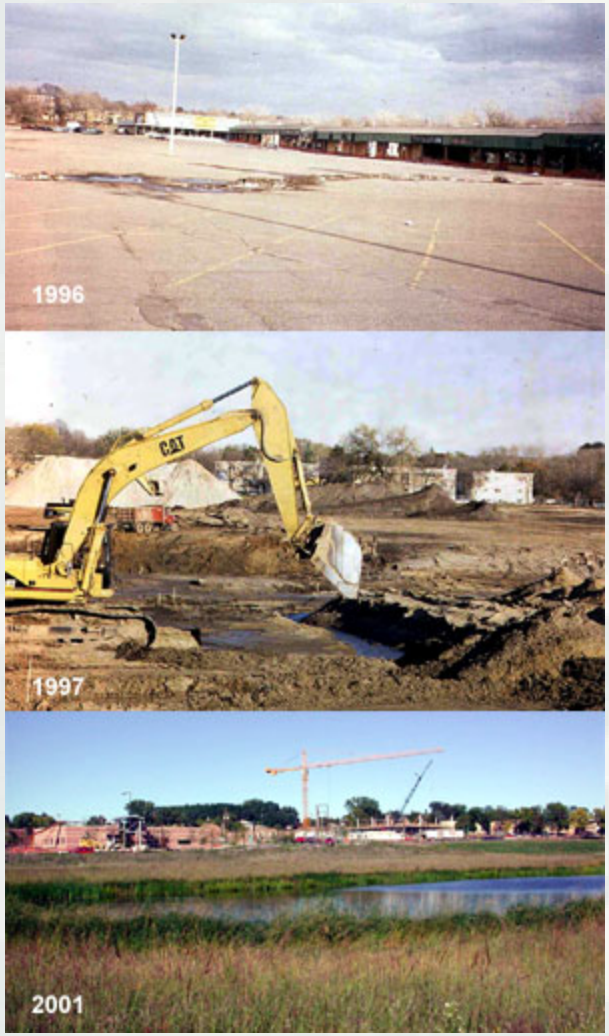
FAQs (continued)

- **Q13: How can I base a ratio on CRAM scores using a numerical formula?**
  - **A: using the checklist, CRAM is used quantitatively to compare functional gain and loss at the mitigation and impact sites, respectively; however, this is just one of among several steps of the checklist, each with its own adjustment. In other words, the numerical impact-mitigation comparison result does not directly, by itself, determine the mitigation ratio.**
- **Q14: CRAM has a documented level of user error. How does this affect the ratio determination?**
  - **A: Every functional/condition assessment method has some level of error. In addition, using a quantitative (or arguably semi-quantitative) method to compare functional gain and loss at the mitigation and impact sites, respectively, likely has less error than the undocumented error associated with "best professional judgment"-based determinations. Also, this is just one of among several steps of the checklist, each with its own adjustment.**
- **Q15: If a multi-agency ratio-setting method has been established in my area, do I still need to use the checklist instead?**
  - **A: Yes, the checklist should be completed, but you can continue to use the multi-agency method. You should fill out the top and bottom portions of the checklist, attach the results using the multi-agency method, and place these documents into the file as part of the administrative record.**

Summary

- Why the checklist
- Factors included in checklist
- Example
- Frequently asked questions

Questions?



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